

SHIP TO SHIP TRANSFERS

PORT OF GOTHENBURG



THE PORT OF SCANDINAVIA

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GLOSSARY

OCIMF STS GUIDE

OCIMF Ship-to-Ship Transfer Guide for Petroleum, Chemicals and Liquefied Gases (2013)

ISGOTT

International Ship Safety Guide for Oil Tankers and Terminals (5th Edition).

OSCP

Oil spill contingency plan

The Equipment provider

The Equipment provider is responsible for the supply of suitably approved and well maintained STS equipment.

The Local Agent

The Agent responsible for facilitating the vessel's visit to port of Gothenburg

STS Loading Master

An experienced STS operative. A qualified Loading Master who has been trained to perform and supervise STS transfers.

Equipment transporter

A company with a suitable vessel to transport the equipment

Reverse Lightering

A STS transfer which involves a loaded tanker mooring alongside an empty or part loaded tanker.

The Client

A Land customer in Gothenburg requesting a STS.

STCW

Marine Regulations issued by the IMO covering the Standards of Training Certification and Watch keeping.

Discharging Ship (STBL or Mother Vessel)

The ship containing cargo for transfer to the receiving ship, and which may also be known as the Ship to be Lightered (STBL) or Mother Vessel.

Loading Vessel (Daughter Vessel)

The vessel loading cargo from the discharging ship usually referred to as the Daughter Vessel.

SIRE

Ship Inspection Report Programme

OCIMF

Oil Companies International Marine Forum.

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1. GENERAL PRINCIPLES

1.1. Foreword

This handbook does not overrule any General Directions, Notice to Mariners or other instructions that may be issued by The Harbour Authority. The Harbour Authority can order the STS operation to stop at any time if it is believed that there is a risk of pollution or if the weather is forecast to deteriorate to unsafe operational levels.

The latest version of the document “Ship to Ship Transfers Port of Gothenburg” is always available on Port of Gothenburg’s homepage: www.goteborgshamn.se. If this is a printed version of the document always check that there are no later revisions available.

Masters of vessels are to be guided by the latest ICS/OCIMF STS Transfer Guide, ISGOTT, Company Procedures and Harbour Byelaws and General Directions for Navigation. The STS Loading Master will advise the Master both verbally and via checklists of any local requirements.

The objective of this document is to ensure that all STS transfers are conducted in accordance with OCIMF STS GUIDE, ISGOTT and the port Oil Spill Contingency Plan (OSCP) in a consistently safe and efficient manner.

1.2. Scope

In order to comply with internationally accepted guidelines, this manual shall be read in conjunction with OCIMF STS GUIDE and the International Safety Guide for Oil Tankers and Terminals (ISGOTT) as well as the Operating Regulations for the Energy Port, Port of Gothenburg.

1.3. Control of Operations

The overall advisory control of an STS transfer in Gothenburg lies with the STS Loading Master. It is not the intention to relieve the Master of either vessel of any of their duties, requirements or responsibilities. A STS Loading Master will be appointed to each STS operation.

The local agent shall assess the quality of nominated vessels for STS transfers within Gothenburg, utilising the best information available.

The Equipment provider is responsible for the condition and maintenance of the STS equipment. The STS Loading Master must relay condition reports of the equipment to the Operations Manager of the Equipment provider after every STS.

During the STS operation the following shall apply:

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- Harbour Pilots shall be engaged to the same extent as for ship to shore transfers. The Pilot will work closely with the respective Masters' and the STS Loading Master regarding safety and mooring.
 - During a STS transfer, in the event of an emergency situation, or in the event of deteriorating weather, the Masters of the vessels involved and the STS Loading Master, shall call the Local Agent and order Pilot (or Pilots) and suitable tugs to standby to unmoor the vessels.
 - The STS Loading Master will be on board continually, monitoring the STS operation.
 - The Cargo Inspector normally advises the amount of cargo to be transferred. The STS Loading Master shall work closely with the STS Team to ensure safe and timely transfers.

The principles of the 'Bridge Management Team' will be observed, with special emphasis on teamwork and sharing of information. The STS Management Team consists of the Masters of the two vessels, the pilot(s), the STS Loading Master, the ship's Agent and the Cargo Inspector.

The ship's Agent together with the equipment provider are responsible for the arrangement and delivery of the STS equipment to site.

1.4. Document Control

The STS Handbook is a live document and will be reviewed on an annual basis in the light of operational experience and the regulatory environment. The latest revision will always be available on www.goteborgshamn.se.

2. CONDITIONS AND REQUIREMENTS

2.1. Ship Compatibility

The Client shall ensure that the vessels are suitable to conduct STS lightering.

2.2. Approval from Port

The local Agent shall work closely with the Client and the STS Loading Master and keep the Harbour Authority advised of the ETA's of ships' likely to be performing STS transfers.

The local Agent shall also send and receive Checklist (1), *see Appendix 1* and relay the reply to the Client.

Approval for an STS transfer will be given by the Harbour Authority after careful assessment of the vessels involved, weather forecasts for planned duration of operation, other operations etc. and consultation with the Client.

2.3. Transfer Area

STS transfers will take place at Berth 800 in Torshammen.

2.4. Weather and Sea Conditions

STS Operational Parameters

When weather forecasts predict mean wind speeds above 20 m/s, the Harbour Master will make a decision regarding arrival of ships and departure of ships at berth. This decision takes into account predicted wind speed and direction, moorings, ship sizes, availability of tugs etc.

At continuous wind speeds above 20 m/s the following shall be done:

- All cargo transfer operations must be suspended
- All cargo transfer and vapour return hoses must be drained and disconnected

At predicted continuous wind speeds above 25 m/s the following shall be done:

- All operations are suspended and ships must leave berth

Safety factors that will be taken into account by the STS Loading Master are as follows:

- The movement of the two ships (i.e. severe wind and sea conditions).
- The behaviour and integrity of the fenders. Vessel mooring failure. Failure of one or more mooring between the vessels or between the ship and shore.
- Weather forecast. Due regard is to be paid to weather forecasts and early action taken to suspend transfers, if safe to do so, when severe weather is imminent.

2.5. Vessel limiting criteria

Ships that are involved in STS operations at Berth 800 are limited by the following criteria:

Max combined displacement:	320 000 ton
Min dwt:	8 000 ton
Max dwt:	80 000 ton
Max LOA:	265 m
Max combined beam of both ships:	57 m
Max draught	17 m
Min freeboard	1.5 m

2.6. Product criteria

Type of product must be approved by Port of Gothenburg Energy Port prior the STS operation.

2.7. Quality Assurance

The STS Loading Master company shall retain a complete record of STS transfers it has completed.

The Equipment provider maintains complete records of the equipment.

The STS Loading Master company is normally vetted by clients to ensure consistent and safe practices.

3. SAFETY

3.1. Risk Management

Procedures are in place to ensure compliance with both statutory and local law.

Appropriate procedures are in place to reduce risk to a low as reasonably practicable (ALARP).

A Risk analysis covering STS operations at berth 800 has been conducted by the Port of Gothenburg.

3.1.1. Prevention of Fatigue

Human error from fatigue is perceived to have contributed to a number of marine casualties.

Ships' crews and STS support personnel must follow the guidelines as per the relevant ILO, IMO and national regulations when planning hours of work. In this respect, it is the duty of the STS Management Team to plan rest periods accordingly, requesting additional staff when necessary.

3.1.2. Personal Protective Equipment (PPE)

All personnel involved in STS operations in Gothenburg shall follow ISGOTT guidelines regarding PPE and protective clothing.

PPE is defined as:

- Hard hat
- Protective clothing (covering arms and legs)
- Life-vest
- Safety shoes (with protective toe caps)
- Work gloves
- Goggles or protective spectacles
- Portable gas meter

The STS Loading Master is supplied with PPE. It shall be worn:

- When joining and leaving vessels
- When working in PPE designated areas
- When working on the open decks of vessels
- Life-vests must be worn when transferring between boats/vessels and when working near water where handrails are ineffectual or non-existent

3.2. Safety Drills

Each vessel, prior to a STS transfer, shall conduct a suitable STS safety drill. Such drill should include emergency unmooring and the usage of SOPEP pollution response gear. Suitable entries should be inserted into the ships' logbook.

3.3. Checklists

STS transfers are completed in accordance with the latest OCIMF/ICS STS Transfer Guide. Port of Gothenburg STS checklists are OCIMF/ICS STS Safety checklists with amendments included to comply with local conditions and regulations.

STS checklist (1) will be sent to vessels programmed for STS transfer by the STS Agent. The replies will be vetted by the STS Agent who will confirm the suitability of nominated vessels for STS transfer and advise the Client accordingly.

Confirmation is based upon:

- Port state control records
- Ship suitability (e.g. suitable moorings and leads)
- Environmental suitability (e.g. clean ballast, no noxious gases in cargo tanks and normally double hull)

During mooring and transfer it is the duty of the STS Loading Master to complete the requisite checklists, together with senior Officers of both vessels, in a timely manner as follows:

- Safety Checklist (2) 'Before Operations Commence'
- Safety Checklist (3) 'Before Run-In and Mooring'
- Safety Checklist (4) 'Before Cargo Transfer'

- Safety Checklist (5) 'Before Unmooring'

3.4. Action in Case of Infringement of Safety

In the event of a safety infringement or breach of safety requirements during a STS transfer, the Master of either ship, or the STS Loading Master are to suspend operations until the situation is rectified. Operations are not to resume without the unanimous agreement of the STS Management Team.

3.5. Safety and Environmental Considerations during Cargo Transfer

The basic safety requirements for a STS transfer are similar to those for a normal port cargo operation as contained in the latest edition of ISGOTT.

3.5.1. Smoking and Naked Lights

Regulations regarding smoking and the use of naked lights should be strictly enforced by the respective Masters and checked by the STS Loading Master.

3.5.2. Earths on Electrical Switchboards

If earth indicator lights are showing on the main switchboard, faults must be traced and isolated. This is to avoid the risk of arcing, especially in deck areas where gases accumulations may be present.

3.5.3. Soot blowing

It is forbidden to blow tubes during STS transfer.

In case of sparking from the funnel, transfer operations should be stopped immediately.

3.5.4. Hoses (Stray Current)

In order to eliminate arcing due to stray current between the two ships when presenting the hose string for connection, insulating flanges must be used for the vapour return hose in accordance with ISGOTT guidelines.

Insulating flanges shall be positioned between the hoses, so at least two hoses must be used. The insulating flange shall be positioned between the ships so that the flange connection cannot come in contact with either ship.

If the type of hoses are semi-discontinuous, any potential difference between the ships is equalled in a controlled manner as soon as oil transfer hoses are connected. To avoid the risk of electrical arcing when connecting vapour return hoses, oil transfer hoses must be connected before the vapour return hoses.

Switching off cathodic protection systems of the impressed current type is not always considered to be a feasible method of minimising ship-to-ship potential differences of current. In the absence of insulation between the ships, the potential difference should be reduced as

much as possible. If both ships have properly functioning impressed current cathodic protection systems, then this is probably best achieved by leaving them both switched on. If the systems are of different design (e.g. sacrificial anode type / impressed current type) then they should both be switched off.

Other Places Where Electrical Arcing May Occur

All STS mooring lines shall be ropes, or wires insulated by using the natural properties of soft rope tails. If soft rope tails are utilised, they must be of sufficient length to extend to the out-board side of the ship receiving the mooring.

Care shall be taken to avoid low resistance ship-to-ship electrical contact in the following areas:

- Non-insulated metallic ladders or gangways between the ships – by fitting rubber ends
- Derrick or crane wire runners and hooks – by careful operation
- Unprotected bare wires and chains within fender support nets or cages – by good quality maintenance

3.5.5. The Use of Radio and Satellite Communication Equipment

The ships main radio transmitting aerials on both ships shall be earthed and neither ship shall use this equipment whilst alongside one another.

Mobile telephones and non-intrinsically safe electrical items must not be used, or carried when switched on, on the open cargo deck.

Satellite communications present no safety hazard, but must not be used if flammable gas accumulates near the antenna. AIS equipment is considered safe and should be kept operational for the purposes of port VTS.

3.5.6. Radar Usage

Guidance on radar usage is clearly described in OCIMF STS GUIDE 3.5.6 (3.3.6 liquefied Gases). 3cm. Radar should not present an ignition hazard. 10cm. Radar shall not be used when there is a possibility that the scanner may point directly at or near the cargo deck of the adjacent vessel.

In any case, care must be taken when using radar and consultation between the STS Management Team is advisable.

3.5.7. Gas Accumulation, Mercaptan and H₂S

STS transfer operations will be suspended if, in the view of the STS Loading Master or ships' officers, cargo vapour accumulation around the decks or manifolds of either ship constitutes a risk to the vessels or personnel. Transfer operations shall not resume without the unanimous agreement of the STS Management Team.

Maximum permitted values are 50 ppm for H₂S and 0,5 ppm for mercaptan. Ships in ballast that have previously carried oil cargoes that are high in H₂S or mercaptan must ensure that their tanks are thoroughly cleaned and ventilated in order to avoid the discharge of noxious

gases to the atmosphere. Ventilation of gases from tanks in loading tankers is regulated in the Operating Regulations for the Energy Port, Port of Gothenburg.

All necessary precautions for personnel safety must be taken when connecting/disconnecting hoses and cargo sampling to avoid the inhalation of excessive hydrocarbon gases. ISGOTT guidelines must be followed and portable gas meters must be utilised to ensure that exposure to H₂S is avoided.

All parties involved in STS activities must have procedures in place for handling cargoes containing high concentrations of H₂S. Limit values for the atmosphere at the workplace regulated by the Swedish Work Environment Authority must not be exceeded.

3.5.8. **Electrical Storms**

Transfer operations must be suspended and all vent risers, cargo systems and IGS systems secured in the event of an electrical storm passing near to or over vessels engaged in STS operations.

3.5.9. **Galley Stoves**

Before permitting the use of galley stoves and other cooking appliances while a vessel is engaged in STS operations, responsible ship's Officers must ensure that such appliances are safe and that no danger exists.

3.5.10. **Readiness of Fire Equipment**

Fire fighting equipment must be ready for immediate use on both ships. Foam monitors on each ship should be pointed towards the cargo manifold in use and left in a suitable condition for hands-off operation.

3.5.11. **Accommodation Openings**

All access doors to the accommodation, especially those opening directly on to the cargo deck, should be kept closed during cargo transfer operations. The Master of each ship should designate those access doors that are to be used for personnel transit. Such doors, if used for personnel transit, must be closed immediately after use.

Air conditioning units should be set on re-circulation in order to avoid the inadvertent intake of gaseous vapours.

3.5.12. **Unauthorised Craft (ISPS Code)**

No unauthorised craft should be allowed alongside either ship at any time prior to, during or after the STS transfer. In this respect attention should be focused towards local regulations and the International Ship and Port Facility Security Code (ISPS Code), which refer to the possibility of terrorist activity. All visitors and visiting craft must be vetted and authorised by the Shipboard Safety Officer. Crew and store craft leave from an ISPS approved port. The Agent will give prior notice and full details of any launch that is due to visit ships engaged in STS transfers.

3.6. Manning Considerations during Cargo Transfer

Masters should take into consideration the estimated duration of operations to ensure that safe and fatigue free watch keeping can be maintained throughout.

Crew changes are not allowed during the STS operation.

In considering the manning required in respect of the STS operation, due regard must be paid to legislation relating to minimum rest periods for the crew.

For reasons of crew workload, transfer operations taking place simultaneously on either side of the STBL are not generally recommended.

A 'Risk Assessment' will be completed for each STS transfer by the STS Loading Master. This is normally of a generic nature, suitably adapted for each operation. The risk assessment will typically consider weather forecast, involved ships, cargo, equipment, personnel transfers as well as other factors that can have an effect on a safe coml

3.7. Storing During STS Transfer

In exceptional circumstances, storing operations can take place subject to:

- The STS Management Team are in agreement
- Suitable safety precautions are in place
- Suitable security (ISPS Code) measures have been taken
- OCIMF and industry guidelines are followed
- Procedures regarding supply operations in Torshamnen must be taken into consideration.

3.8. Bunkering Operations during STS Operations

No bunkering or sludge handling is allowed during STS operations.

4. COMMUNICATIONS

4.1. General Communications

Good communications between the ships are an essential requirement for successful STS transfer operations. The Client may supply approved, UHF radios.

4.2. Language

To avoid any misunderstanding, a common language shall be agreed before operations commence.

4.3. STS Instructions

The Charterer's Agent will normally pass on details of STS transfers to the Master and the STS Loading Masters. The STS Loading Masters will brief each Master on local requirements and STS transfer procedures.

4.4. Initial Verbal Communications

No manoeuvring or cargo transfer is to take place unless good communications between vessels is established. The checklists 2 and 3 will be completed prior to mooring.

4.5. Navigational Warnings

The VTS Gothenburg will issue any navigational warnings that may be required.

4.6. Communication during Approach, Mooring and Unmooring

The pilot designates VHF channel for mooring. Clear mooring instructions will be given to each Master prior to approach. Upon completion of mooring, suitable communication will be agreed for cargo transfer. Clear unmooring instructions will be given to each Master by the pilot prior to casting off. The pilot will designate a VHF channel for unmooring.

4.7. Communication during Cargo Transfer

During cargo transfer, key personnel on both ships must maintain a common means of communication. This is normally via hand-held UHF radios.

4.8. Procedures for Communication Failure

In the event of a communication breakdown during an approach manoeuvre, and if appropriate and safe to do so, then the manoeuvre should be aborted. During cargo operations, in the event of a complete breakdown in communications on either ship, the emergency signal (7 or more short blasts on the ships whistle) should be sounded and transfer suspended in a safe and controlled manner. Transfer should not resume until satisfactory communications have been re-established.

5. OPERATIONAL PREPARATIONS BEFORE MANOEUVRING

5.1. Preparation of Ships

Ships engaged in STS transfers must ensure that preparations and planning are conducted as per OCIMF STS GUIDE.

To assist towards this, the STS Loading Master will supply checklists, smoking notices and environmental inspection check sheets.

The checklists should be completed in good time, such that vital equipment (e.g. long messengers and oil spill emergency response equipment) are identified and prepared early.

Each Master, together with key ships' officers, will be briefed by the Pilot and/or the STS Loading Master regarding the mooring plan, tug utilisation and contingency plans.

5.2. Navigational Signals

Lights and shapes must be shown on vessels engaged in STS operations as per the International Regulations for the Prevention of Collisions at Sea.

6. MANOEUVRING AND MOORING

6.1. *Basic Berthing Principles*

Providing traffic and weather conditions and local restrictions permit, berthing and unberthing operations can be conducted during daytime or night-time.

6.2. *Manoeuvring Alongside*

The larger vessel is normally berthed alongside the berth.

The smaller tanker manoeuvres alongside larger tanker in a controlled manner under pilotage utilising its thrusters or with tug assistance.

The final approach angle must be as slight as possible and the transverse closing speed less than 0.3 knots.

Transverse speed is directly related to the energy absorption of each fender (particularly No.1 fender). The greater the transverse speed the greater the energy absorption required by the fenders. It is therefore VITAL that the transverse speed does not exceed 0.3 knots, especially when performing reverse lightering of large vessels (e.g. the mooring of a Suez max. tanker alongside a VLCC).

The use of tugs for the ship berthed alongside the berth is regulated in Tug regulations of Port of Gothenburg. This is also valid for the outer ship, with the exception that **if the outer ship has a length over all above 180 meters, at least 3 tugs must be used.**

6.2.1. **Reverse Lightering**

Reverse lightering is the manoeuvring of a loaden vessel alongside a larger ballasted or partly loaded tanker.

Excessive transverse speed when performing reverse lightering will cause the safety valves of the fender(s) to lift, resulting in reduced performance of the fenders.

When conducting reverse lightering at anchor, the Master, the Pilot and the STS Loading Master must ensure that sufficient tugs, of suitable bollard pull, are utilised for mooring and unmooring, bearing in mind the slower response of loaded tankers.

6.3. Mooring Preparations

The approach and methodology of mooring are explained in the OCIMF STS GUIDE.

Tug boat is mandatory during mooring operations, Review the tug boat regulations for the port of Gothenburg for further details. See Tor harbour.

Careful planning is essential. The sequence of mooring, the selection of leads and the importance of avoiding wires and ropes passing through the same lead all play an important part in the pre-planning of the operation.

It is essential that both vessels prepare good messengers for mooring. Standard STS messengers are 40 mm UV stabilised plaited polypropylene rope, usually approximately 200 metres in length. These messengers are required as standard during US Gulf and Pacific lightering.

Closed leads shall be utilised for all moorings.

Wire mooring ropes must be fitted with suitable rope pennants.

It is the responsibility of the STS Loading master to coordinate information exchange between ships prior to mooring. Fenders must be positioned according to manifold positions in relation to parallel body of both vessels.

The Master of the ship moored to berth must take into consideration the forces from both ships when planning the mooring arrangement. Minimum requirements are listed in the Port Information Guide for the Port of Gothenburg. The pilot is familiar with these requirements.

The mooring requirements for the ship moored outside the other ship is equal to those for a ship moored at berth 800. Minimum requirements are listed www.goteborgshamn.se, Berth Specifications If sufficient moorings cannot be achieved between the ships, moorings to berth can be used if possible. Fore and aft moorings to berth for the outside ship are recommended when possible.

If sufficient mooring cannot be ensured in the opinion of the Master of either ship or the Loading Master, operations must be stopped until the situation has been rectified.

A mooring boat should always be available for mooring operations.

7. CARGO TRANSFER AND ENVIRONMENTAL CONSIDERATIONS

7.1. *Vapour Balancing*

Vapour Balancing shall be used if both ships are inerted in accordance with ISGOTT guidelines. Vapour balancing can also be used if the receiving ship is equipped with an Inert Gas System, and the discharging ship is not inerted subject to:

- The STS Management Team are in agreement
- OCIMF and industry guidelines are followed
- Discharging ship follows applicable ISGOTT procedures regarding Inert Gas Systems.

Appendix 7 of this manual contains a checklist for Vapour Balancing.

7.2. *Pre-Transfer Procedure*

When the two ships are alongside and securely moored, suitable communications is established for cargo operations. The Ship-to-ship checklist 4, GHAB Ship-to-Shore Safety checklist and a ship-to-ship Cargo Handling Plan are to be completed with the STS Loading Master in attendance prior to transfer commencing.

In port, the ship's SOPEP and Port facilities are considered sufficient to counter most foreseeable incidents.

7.3. *Connecting hoses*

Oil transfer hoses must be connected before vapour return hoses to avoid the risk of electrical arcing, see 3.5.4 Hoses (Stray Current).

The crew on each ship is responsible for connecting and disconnecting cargo and vapour return hoses.

7.4. *Responsibility for Cargo Operations*

Cargo transfer operations are carried out in accordance with the requirements of the RECEIVING ship. It is normal for the Chief Officer of each ship to be identified as the person in charge of the transfer. He/she may delegate responsibility to qualified watch-keepers during rest periods.

The STS Loading Master is not directly responsible for cargo transfer, but must nevertheless monitor cargo operations to the best of his/her ability, in order to ensure that the transfer is conducted in a safe and controlled manner.

Cargo transfer must be stopped if there is a breach of safety regulations or a risk of environmental pollution.

7.5. Planning for Cargo Transfer

When planning cargo transfer during an STS operation, the following points should be considered and addressed accordingly:

- Ensure adequate stability and endeavour to minimise free surface effect.
- Ensure stress limits are not exceeded
- Ensure trim and list limits are not exceeded
- Confirm grade(s) and rates of transfer
- Clarify local or governmental rules that apply to the transfer (deballast restrictions, reporting criteria, dispersant restrictions in the event of a spill etc.)
- Material Safety Data sheet (MSDS) to be transferred from loaded vessel.
- Cargo transfer / loading plan must be agreed and exchanged before transfer commences.
- ISPS Code ship security plan in operation.

7.6. Cargo Transfer - General Guidance

Environmental protection is of paramount importance. Therefore the slow speed checks for hose integrity and ships cargo line integrity are vital.

The cargo control room (CCR) and intership communication radio must be manned at all times throughout the transfer. The cargo transfer speed **MUST NOT** be increased until both vessels and the STS Loading Master has completed the 'slow speed checks'.

Once the 'slow speed checks' have been confirmed satisfactory, then cargo transfer is slowly increased up to full speed, in accordance with vessel and hose capacities and pressures. Further checks must then be completed.

A responsible watch-keeper must be in attendance at the cargo manifold of each vessel throughout transfer.

At least 10 minutes notice is required for a change of transfer rate and topping off rate. This is agreed during pre-planning.

The amount of cargo transferred is to be compared hourly. This will avoid large unseen leakages, especially during the hours of darkness.

The venting of vapours (whether by vapour balancing or to atmosphere) must be carefully monitored and controlled.

Ballast water management plans is compulsory from date 2017-09-08 in order to avoid the introduction of invasive species to the local environment. Moorings must be regularly checked and adjusted accordingly.

Moorings must be tended on an hourly basis concurrently on each vessel in order to ensure all ropes retain similar tension.

7.7. Ballast Handling

Although oil tankers engaged in STS have double hulls and segregated ballast, it is essential the IMO Water Ballast Management must be followed.

Regulations for handling ballast can be found in the Operating Regulations for the Energy Port, Port of Gothenburg.

7.8. Operations after Completion of Cargo Transfer

After the completion of the cargo transfer, the following operations will be carried out with the STS Loading Master in attendance:

- Hoses drained, one by one, into the most suitable vessel.
- Hoses disconnected and blanked, complete with suitable gasket and ALL bolts inserted correctly, (bolt heads exposed and bolt threads beneath the flange, thus avoiding thread damage when lifting).
- Ship's manifolds blanked.

It is imperative that every precaution is taken to avoid the inadvertent spillage of oil on deck. It is therefore necessary for the STS Loading Masters to be present during disconnection.

The crew on each ship is responsible for connecting and disconnecting cargo and vapour return hoses.

7.9. Cargo Documentation Requirements

The ships' Agent will normally handle cargo documentation.

7.10. Disposal of Waste

Disposal of rubbish is regulated in the Port regulations for the Port of Gothenburg.

8. UNMOORING

8.1. *Unmooring Procedure*

Unmooring will normally be completed with the smaller ship sailing away. Tug boat is mandatory during unmooring operations.

8.2. *Unmooring Checks*

Upon completion of Checklist 5, unmooring can commence.

8.3. *Procedure for Unberthing*

Unberthing differs very little from a normal departure from berth. Important factors to consider are wind, current, ship's equipment and number and type of tugs.

8.4. *Tug Utilisation for Mooring and Unmooring*

The use of tugs for the ship berthed alongside the berth is regulated in Tug Regulations for Port of Gothenburg. This is also valid for the outer ship, with the exception that **if the outer ship has a Length over all above 180 meters, at least 3 tugs must be used.**

9. EQUIPMENT

9.1. *Fenders (See also Appendix 5)*

ISO 17357

A new International Standard (ISO 17357-2) specifies the material, performance and dimensions of floating pneumatic fenders which are intended to be used for the berthing and mooring of a ship to another ship or berthing structure.

Each fender certified to ISO 17357-2 shall have markings on the fender body to indicate the following:

- International Standard number, and applicable year, i.e. ISO 17357:2014
- Size, diameter and length
- Initial internal pressure
- Date of manufacture or its abbreviation
- Full or abbreviated name of manufacturer
- Individual serial number
- Type of reinforcement layer

The markings of the manufacturer, for internal pressure rating and size, shall be of a suitable size and finish to enable clear identification. The letter heights shall be 100 mm minimum for fenders whose diameters are 2500 mm and larger.

Fenders can be equipped with an identification system buried within the fenders body.

Documentation

The manufacturer provides certification that fenders have been tested and inspected as specified in this International Standard and that all the requirements have been met, together with a test and inspection report as well as a material certificate for the synthetic tyre cord that is used for the manufacture of the fenders.

The manufacturer provides a maintenance manual, in the format of a logbook, where details are recorded for all the maintenance and repairs carried out on the fender, including safety valves, from new to date. All maintenance and repairs carried out on the fender must be to manufacturer's guidelines. The manufacturer also provides a handling/storage/packing recommendation.

Fenders used in STS transfer operations are divided into two categories:

- Primary fenders, which are positioned along the parallel body of the ship to afford the maximum protection while alongside. They are also designed to absorb energy as the vessels berth alongside.
- Secondary fenders which are used to protect the bow and stern plating from inadvertent contact if the ships get out of alignment during mooring or unmooring.

In general, fenders are placed on either:

- Port side of the manoeuvring ship
- Starboard side of the receiving ship

Care must be taken to ensure that the fenders are maintained at their design pressure during STS usage. The type and size of fender to be used should be evaluated in the risk assessment for each operation by the STS loading master. Recommendation is a pneumatic 50 fender with internal pressure of 0,5bar, (0.5kgf/cm²). Maximum allowed displacement for manoeuvring ship is 125 000 tonnes and maximum berthing speed is 0.2 knots.

If 'Pneumatic 80' fenders are ever used, they are inflated to 0.8 Bar (0.8 kgf/cm²). The increased pressure and the higher fender specifications, result in higher guaranteed energy absorption and reaction forces.

Details of the energy absorption capabilities for fenders of varying dimensions can be found in the manufacturer's handbook.

Secondary fenders are always utilised in accordance with OCIMF recommendations.

Fender moorings must be tended during transfer operations.

During multiple transfers the STS equipment must be checked after each transfer in the best manner available.

9.2. Hoses

Oil transfer Hoses

- Yokohama hoses - are semi-discontinuous. Hoses of similar diameter can be connected together without risk of electrical arcing.
- Amiflex hoses are similar to Yokohama hoses and hoses of similar diameter can be connected together without risk of electrical arcing.
- Dunlop hoses – some hoses have two orange bands at each end. These hoses are electrically continuous. Other hoses have no bands at the ends. These hoses are electrically discontinuous. When joining Dunlop hoses it is essential that there is one electrically discontinuous hose in each string.

When the Loading master selects suitable hoses for the STS operation precautions against static electricity and stray current hazards must be observed.

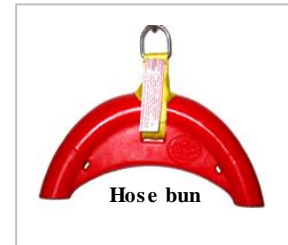
Flexible rubber hoses are used for black oil (usually bunker) transfers.

If electrically continuous hoses are used, an isolating flange must be used in each string of hoses.

9.2.1. Hose Standards

The following criteria are a summary of the manufacturer guidelines:

- Avoid kinking the hoses. Lift them on board using a suitable sling around the body of the hose, at one end, clear of the flange.
- NEVER lift a hose utilising a blank flange handle as a lifting point.
- Use a 'hose saddle or hose bun' to lift a composite hose
- Ensure that the maximum product temperature does not exceed 82 °C.
- Ensure the hoses are suitably stowed between STS transfers.
- Protect hoses from direct sunlight during stowage (ambient temps. -29 to +52 °C).



9.2.2. Hose Size and Length

The number of hoses and length of each string is determined by the STS Loading Master in consultation with the Masters of each vessel. It is necessary to determine the maximum free-board difference of the vessels to ensure that an adequate length of hose is supplied.

The minimum bend radius (MBR) is given by the formula:

$$\text{MBR} = \text{Nominal bore of the hose} \times 6$$

9.2.3. Hose Connection

During connection of the hoses, both hose to hose and hose to ship, new gaskets are recommended and all boltholes must be utilised.

Although sometimes difficult to monitor, it is necessary to stress that the bolts should be tightened sequentially and opposite (i.e. 12-6-3-9).

It is recommended that the hose be supported utilising the ships crane/derrick and slings, as well as by the securing rope at the ships hose rail. Tools utilised for connection must not be capable of producing an incendiary spark.

It is essential that suitable slings be utilised for lifting the hoses (supplied by STS Loading Master). **Never lift rubber hoses using wire strops.**

9.2.4. **Hose Inspection and Testing**

Hoses are tested in line with OCIMF Guidelines for the handling, storage and inspection and testing of hoses in the field. Manufacturer's instructions are also in line with this publication.

Hoses are to be inspected during each STS transfer by the STS Loading Master. Defects to look for are as follows:

- Damage to inner lining
- Blistering, cuts, abrasion damage on outer cover
- Flattening or kink damage (cracking)
- Evidence of leakage on outer cover
- Flange damage

Hoses must be tested by THE EQUIPMENT PROVIDER (approved contractor) every year and tested all together 3 times per year.

All hoses should have test certificates which are held by the equipment provider. Hose certificates to be presented for the STS loading master for each operation.

9.2.5. **Marking**

The manufacturer, in accordance with EN1765, marks each hose. STS Loading Masters are to record the numbers of the hoses utilised for oil transfer.

9.2.6. **Flow Velocities**

Cargo transfer hoses should be certified for a transfer at maximum flow rates per m/s. The STS loading master need to determining the safe maximum rate of transfer and flow rate for each operation. The flow rate must be determined according to ISGOTT guidelines.

In determining the flow rate velocity, due regard must be paid to the capabilities of the ships' pipelines, the behavior of the hoses at the manifold and whether the product is static or non-static accumulator.

9.3. *Mooring Equipment*

It is important that ships are fitted with good quality mooring lines; efficient winches and well placed closed fairleads or bollards. It is important that closed fairleads are utilised, unless it is clearly established that one ship will ALWAYS have a greater freeboard than the other. It is usual to utilise moorings from each vessel to ensure a well balanced mooring layout.

10. PERSONNEL TRANSFERS

Personnel transfers shall be kept to a minimum and carried out in accordance with OCIMF STS Transfer Guide Petroleum. The STS Loading Master will carry out a risk assessment to ensure that the equipment for personnel transfer is fit for purpose. Suitable procedures must be in place on board the vessel. Life vest must be worn when transferring between vessels.

It is the Masters' responsibility to ensure safe access between ships. If gangways can not be utilised it may be necessary to use alternate means of access, such as mooring boats or launches. Personnel transfers by crane are not allowed in the Port of Gothenburg.

If a boat is used for personnel transfers, transfer to and from this boat is possible via the access point across the pier from the Port Office. Alternate access point is Hjärtholmen. Access to and from the outer ship can for example be via the pilot ladder. Any boats used for personnel transfers must have applicable certificates.

11. EMERGENCIES

11.1. Contingency Planning

Plans for pollution response are available at the berth.

11.2. Emergency Signal

Ships engaged in STS operations must maintain a constant state of readiness. The emergency signal, seven or more short blasts on the ships' whistle, must be understood by all personnel, who should immediately proceed to stations as per the emergency contingency plan.

It is essential that the STS Loading Master familiarises himself with the ships Emergency Plans.

11.3. Emergency Situations

Emergency situations can arise during mooring or unmooring as well as during transfer. The Master, together with the STS Loading Master, is responsible for deciding the best course of action in accordance with the overall safety of both vessels and in accordance with local requirements.

Appendix 1: Checklists

SHIP-TO-SHIP TRANSFER
CHECK-LIST 1 – PRE-FIXTURE INFORMATION (FOR EACH SHIP)
 (BETWEEN SHIP OPERATOR/CHARTERER AND ORGANISER)

Ship's Name: _____ IMO No. _____

Ship Operator:	Ship Charterer:	STS Organiser:	
Preferred Contact No. (e.g. INMARSAT)	Ship Operator's Confirmation	Remarks	
1. What is the LOA? What is the parallel body length at loaded and ballast draughts?			
2. Will the cargo transfer be conducted underway and, if so, can the ship maintain about five knots for a minimum of two hours?	N/A	N/A	
3. Is the ship's manifold arrangement in accordance with OCIMF <i>Recommendations for Oil Tanker Manifolds and Associated Equipment</i> ?			
4. Is the ship's lifting equipment in accordance with OCIMF <i>Recommendations for Oil Tanker Manifolds and Associated Equipment</i> ? Does lifting equipment have a SWL of at least 1.5t?			
5. What is the maximum and minimum expected height of the cargo manifold from the waterline during the transfer?			
6. Sufficient manpower will be provided at all stages of the operation?			
7. Are enclosed fairleads and mooring bitts in accordance with OCIMF <i>Mooring Equipment Guidelines</i> and are they of sufficient number?			
8. Can the ship supplying the moorings provide all lines on winch drums?			
9. If moorings are wires or high modulus ropes, are they fitted with synthetic tails at least eleven metres in length?			
10. Full-sized mooring bitts of sufficient strength are suitably located near all enclosed fairleads to receive mooring rope eyes?			
11. Both sides of the ship are clear of any overhanging projections including bridge wings?			
12. The transfer area has been agreed?			
13. Is the ship equipped with an Inert Gas System? Ship's tanks inerted? (Less than 8 % oxygen)			
14. Is the ship fit for vapour return?			
FOR DISCHARGING SHIP/RECEIVING SHIP (Delete as appropriate)			
Name:			
Name:			
Signature:		Date:	

**SHIP-TO-SHIP TRANSFER
CHECK-LIST 2 – BEFORE OPERATIONS COMMENCE**

Discharging Ship's Name: _____

Receiving Ship's Name: _____

Date of Transfer: _____

	Discharging Ship Checked	Receiving Ship Checked	Remarks
1. The two ships have been advised by shipowners that Check-List 1 has been completed satisfactorily?			
2. Personnel comply with rest requirements of ILO 180, STCW or national regulations as appropriate?			
3. Radio communications are established?			
4. Language of operations has been agreed?			
5. The rendezvous position off the transfer area is agreed?			
6. Berthing and mooring procedures are agreed, including fender positions and number/type of ropes to be provided by each ship?			
7. The system and method of electrical insulation between ships has been agreed?			
8. The ships are upright and at a suitable trim without any over-hanging projections?			
9. Engines, steering gear and navigational equipment have been tested and found in good order?			
10. Ships boilers and tubes have been cleared of soot and it is understood that during STS operations, tubes must not be blown?			
11. Engineers have been briefed on engine speed (and speed adjustment) requirements?			
12. Weather forecasts have been obtained for the transfer area?			
13. Hose lifting equipment is suitable and ready for use?			
14. Cargo transfer hoses and vapour return hoses are properly tested and certified and apparent good condition?			
15. Fenders and associated equipment are visually in apparent good order?			
16. The crew have been briefed on the mooring procedure?			
17. The contingency plan is agreed?			
18. Permission to engage in STS transfer has been granted by the Port of Gothenburg?			
19. A navigational warning has been broadcast?			
20. The other ship has been advised that Check-List 2 is satisfactorily completed?			

FOR DISCHARGING SHIP/RECEIVING SHIP (Delete as appropriate)

Name:

Name:

Signature:

**SHIP-TO-SHIP TRANSFER
CHECK-LIST 3 – BEFORE RUN-IN AND MOORING**

Discharging Ship's Name: _____

Receiving Ship's Name: _____

Date of Transfer: _____

	Discharging Ship Checked	Receiving Ship Checked	Remarks
1. Check-List 2 has been satisfactorily completed?			
2. Primary fenders floating in their proper place? Fender pennants are in order?			
3. Secondary fenders are in place (if required)?			
4. Over side protrusions on side of berthing are retracted?			
5. A proficient helmsman is at the wheel?			
6. Cargo manifold connections are ready and marked?			
7. Course and speed information has been exchanged and is understood?	N/A	N/A	
8. Ship's speed adjustments is controlled by changes to revolutions and/or propeller pitch?			
9. Navigational signals are displayed?			
10. Adequate lighting is available?			
11. Power is on winches and windlass and they are in good order?			
12. Rope messengers, rope stoppers and heaving lines are ready for use?			
13. All mooring lines are ready?			
14. All mooring personnel are in position?			
15. Communications are established with mooring personnel?			
16. The anchor on the opposite side to transfer is ready for dropping?			
17. The other ship has been briefed that Check-List 3 is completed satisfactorily?			

FOR DISCHARGING SHIP/RECEIVING SHIP (Delete as appropriate)

Name: _____

Name: _____

Signature: _____

**SHIP-TO-SHIP TRANSFER
CHECK-LIST 4 – BEFORE CARGO TRANSFER**

Discharging Ship's Name: _____

Receiving Ship's Name: _____

Date of Transfer: _____

	Discharging Ship Checked	Receiving Ship Checked	Remarks
1. The GHAB Ship/Shore Safety Checklist has been satisfactorily completed by berthed ship?			
2. Procedures for the transfer of personnel have been agreed?			
3. The gangway (if used) is in good position and well secured?			
4. An inter-ship communication system is agreed?			
5. Emergency signals and shutdown procedures are agreed?			
6. An engine room watch will be maintained throughout transfer and the main engine ready for use?			
7. Fire axes or suitable cutting equipment is in position at fore and aft mooring stations?			
8. Moorings to the jetty are suitable and continually tended as necessary?			
9. Officers in charge of the cargo transfer on both ships are identified and posted?			
10. A deck watch is established to pay particular attention to moorings, fenders, hoses, manifold observation and cargo pump controls?			
11. The initial cargo transfer rate is agreed with the other ship?			
12. The maximum cargo transfer rates agreed with the other ship?			
13. The topping off rate is agreed with the other ship?			
14. Closed loading/discharge and vapour return between ships is in use during whole operation (If applicable)?			
15. Vapour phase in cargo tanks do not exceed 50 ppm (H ₂ s) and 0,5 ppm (mercaptan)			
16. Cargo hoses are well supported?			
17. Tools required for rapid hose disconnection are located at the cargo manifold?			
18. Details of the previous cargo of the receiving ship have been given to the discharging ship?			
19. The other ship has been advised that Check-List 4 is satisfactorily completed?			

FOR DISCHARGING SHIP/RECEIVING SHIP (Delete as appropriate)

Name:

Name:

Signature:

**SHIP-TO-SHIP TRANSFER
CHECK-LIST 5 – BEFORE UNMOORING**

Discharging Ship's Name: _____

Receiving Ship's Name: _____

Date of Transfer: _____

	Discharging Ship Checked	Receiving Ship Checked	Remarks
1. Cargo hoses are properly drained prior to hose disconnection?			
2. Cargo hoses and / or manifolds are blanked?			
3. The transfer side of the ship is clear of obstructions (including hose lifting equipment)?			
4. Secondary fenders are correctly positioned and secured for departure?			
5. The method of unberthing and letting go moorings has been agreed with the other ship?			
6. Fenders, including fender pennants, are in good order?			
7. Power is on winches and windlass?			
8. There are rope messengers and rope stoppers at all mooring stations?			
9. The crew is standing by at their mooring stations?			
10. Communications are established with mooring personnel and with the other ship?			
11. Shipping traffic in the area has been checked?			
12. Main engine(s) and steering gear (including thrusters) have been tested and are in a state of readiness for departure?			
13. Mooring personnel have been instructed to let go only as requested by the manoeuvring ship?			
14. Navigational warnings have been cancelled (when clear of other ship)?			
15. Permission to sail has been granted by the Port Authority?			
16. The other ship has been advised that Check-List 5 is satisfactorily completed?			

FOR DISCHARGING SHIP/RECEIVING SHIP (Delete as appropriate)

Name:

Name:

Signature:

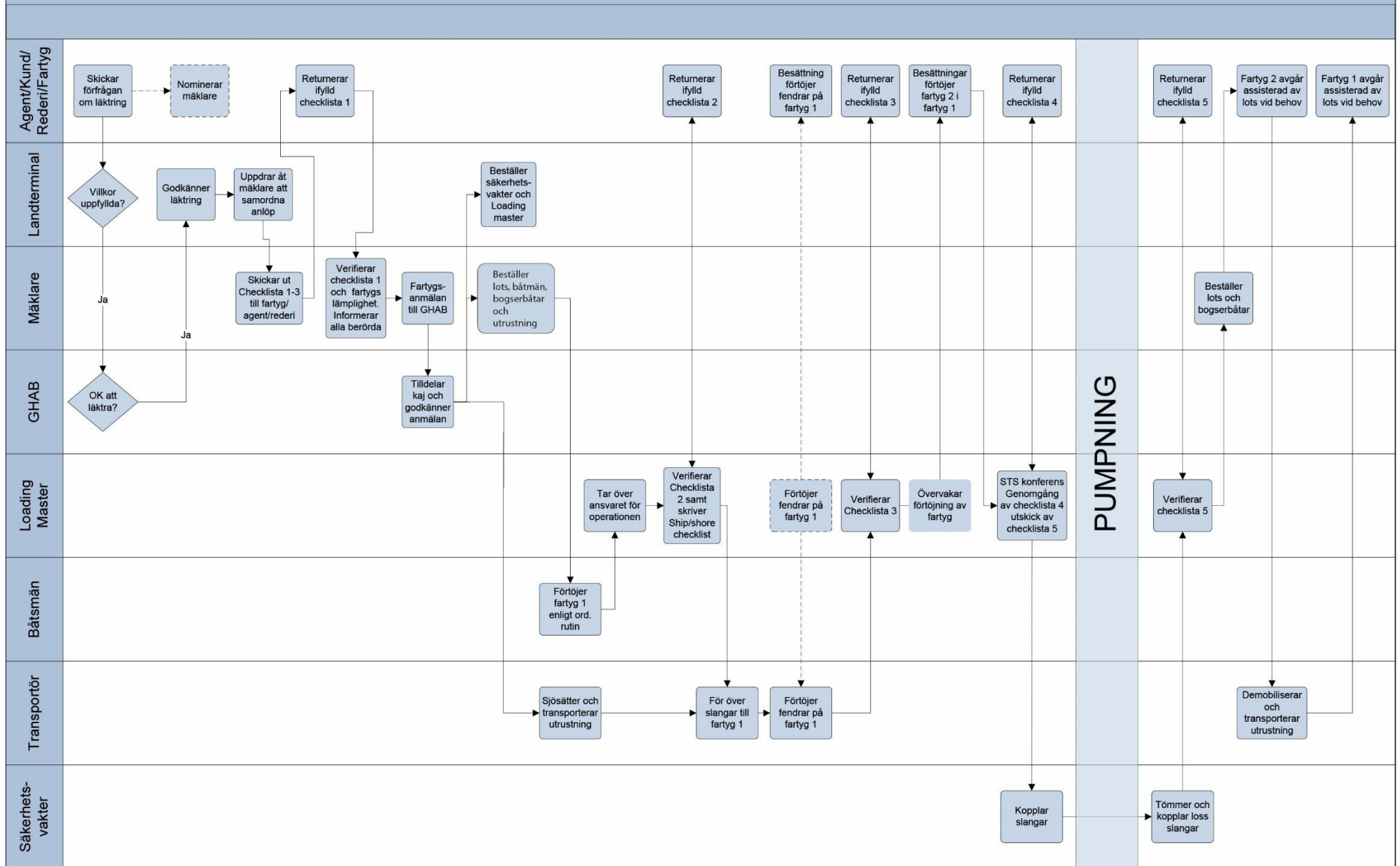
Appendix 2: Contact list

Contact list - STS Gothenburg

Company		Name	Phone	Mobile
Port of Gothenburg	Operations	Dan-Erik Andersson	031-368 75 09	0708-97 12 12
	Operations	Christoffer Lillhage	031-368 75 21	0768-48 75 21
	Operations	Lisbeth Billstedt	031-368 75 23	0702-30 83 01
	Workshop	Henrik Petersen	031-368 75 22	0768-56 30 70
	Operations	Claes Rödén	031-368 76 16	0703-11 71 04
	Port Control			
Port of Gothenburg Torshammen	Pump house		031-368 75 31	
	Jetty		031-54 55 37	
Port Security	Gate Skarvik		031-368 75 28	
	Gate Skarvik	Emergency phone No.	031-368 75 05	
	Port 4		031-368 75 65	
	Port 4	Emergency phone No.	031-368 75 68	
	Port Entry		031-368 75 66	
Boatman (Klippan)	24 h phone		031-14 46 77	
ODEC	Operation	Paul Olsson	031-53 00 76	
	Torshammen	Erling Sundin	0707-83 48 99	
Sjöfartsverket	Area Manager	Pontus Bengtsson	010-4784773	0768 - 54 77 01
	VTS Gothenburg		0771-630 660	
	Pilot		0771-630 670	
NES	24h phone		0761808050	

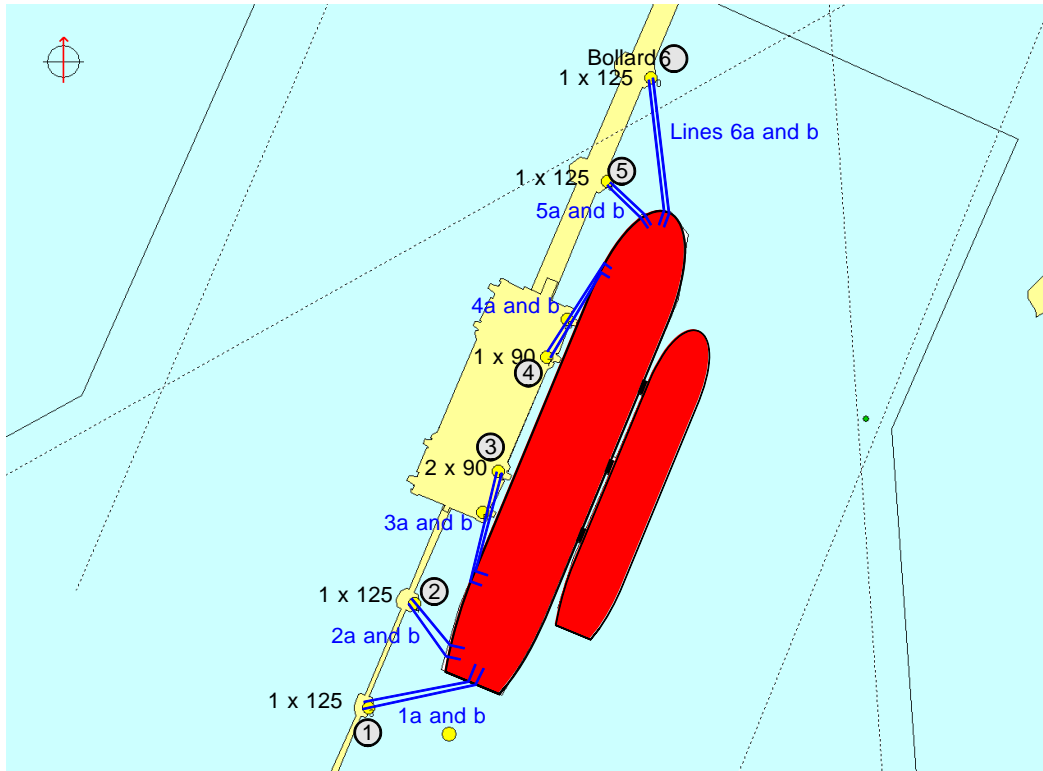
Appendix 3: Communication flow

Läktring STS i Torshamnen



Appendix 4: Mooring arrangement

The figure shows recommended minimum mooring arrangement for a 50 000 dwt tanker in ballast with a fully laden 15 000 dwt tanker moored outside. Mooring arrangement must be evaluated for each operation in cooperation with the Harbour Pilot, based on factors such as vessel sizes, weather forecasts, shipping line requirements etc. Recommended mooring arrangements for larger ships can be on www.goteborgshamn.se, berth specifications.



Appendix 5: Port of Gothenburg Emergency Procedures

PROCEDURES ON BOARD SHIPS IN THE GOTHENBURG OIL HARBOURS IN CASE OF FIRE OR OUTFLOW OF PRODUCT

FIRE

- SOUND THE ALARM by repeated long signals with ship's typhoon or alarm bells
- CALL PORT CONTROL VHF CHANNEL 12
(TELEPHONE +46 31 731 41 15)
or by alarm button on the quay
- MAKE ARRANGEMENTS TO FIGHT THE FIRE
- CEASE ALL CARGO OPERATIONS AND CLOSE ALL CARGO VALVES
- CHECK THAT ALL TANK AND ULLAGE HATCHES ARE CLOSED
- STAND BY TO DISCONNECT CARGO HOSES/ARMS
- MAKE READY FOR THE EVENTUALITY OF UMBERTHING

OUTFLOW OF FLAMMABLE/POISONOUS GAS OR LIQUID

- CEASE ALL CARGO OPERATIONS AND CLOSE ALL CARGO VALVES
- SOUND THE ALARM by repeated long signals with ship's typhoon or alarm bells
- CALL PORT CONTROL VHF CHANNEL 12
(TELEPHONE +46 31 731 41 15)
or by alarm button on the quay

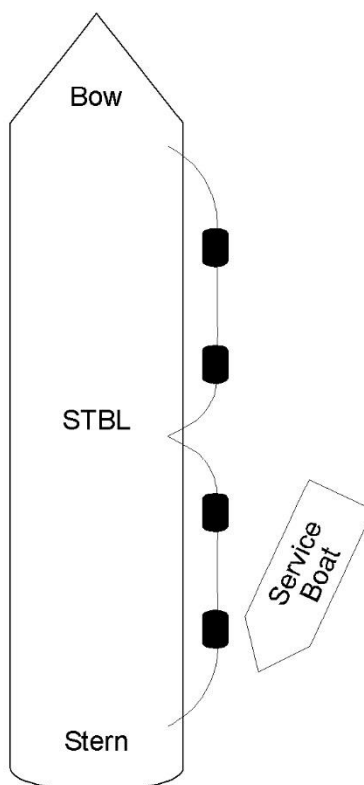
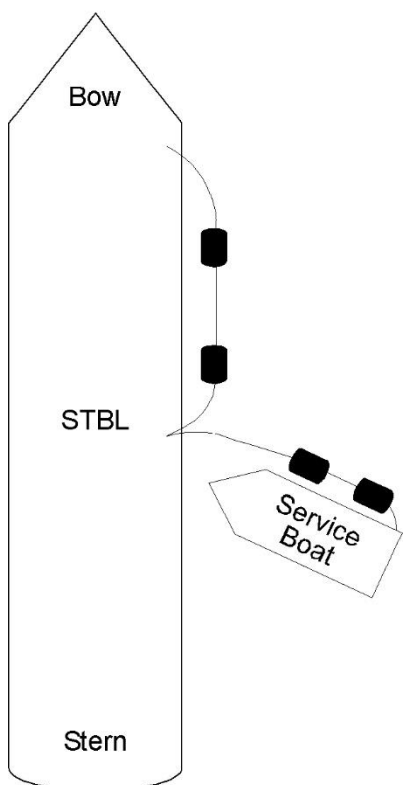
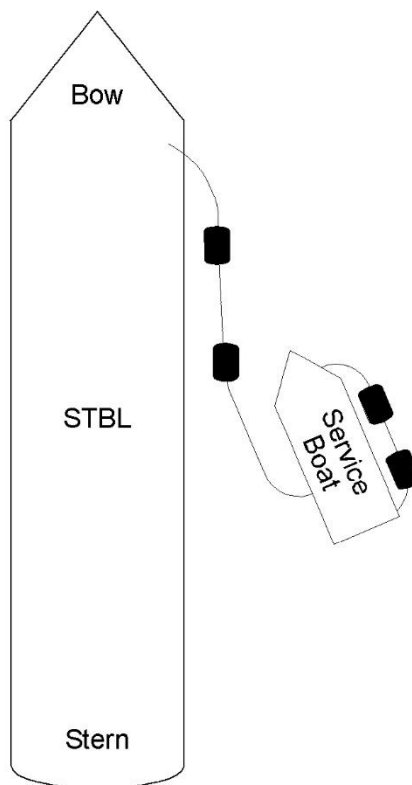
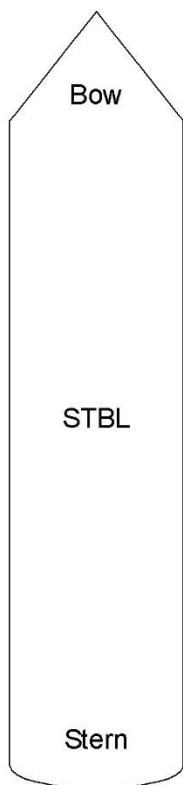
OTHER CARGO OUTFLOWS

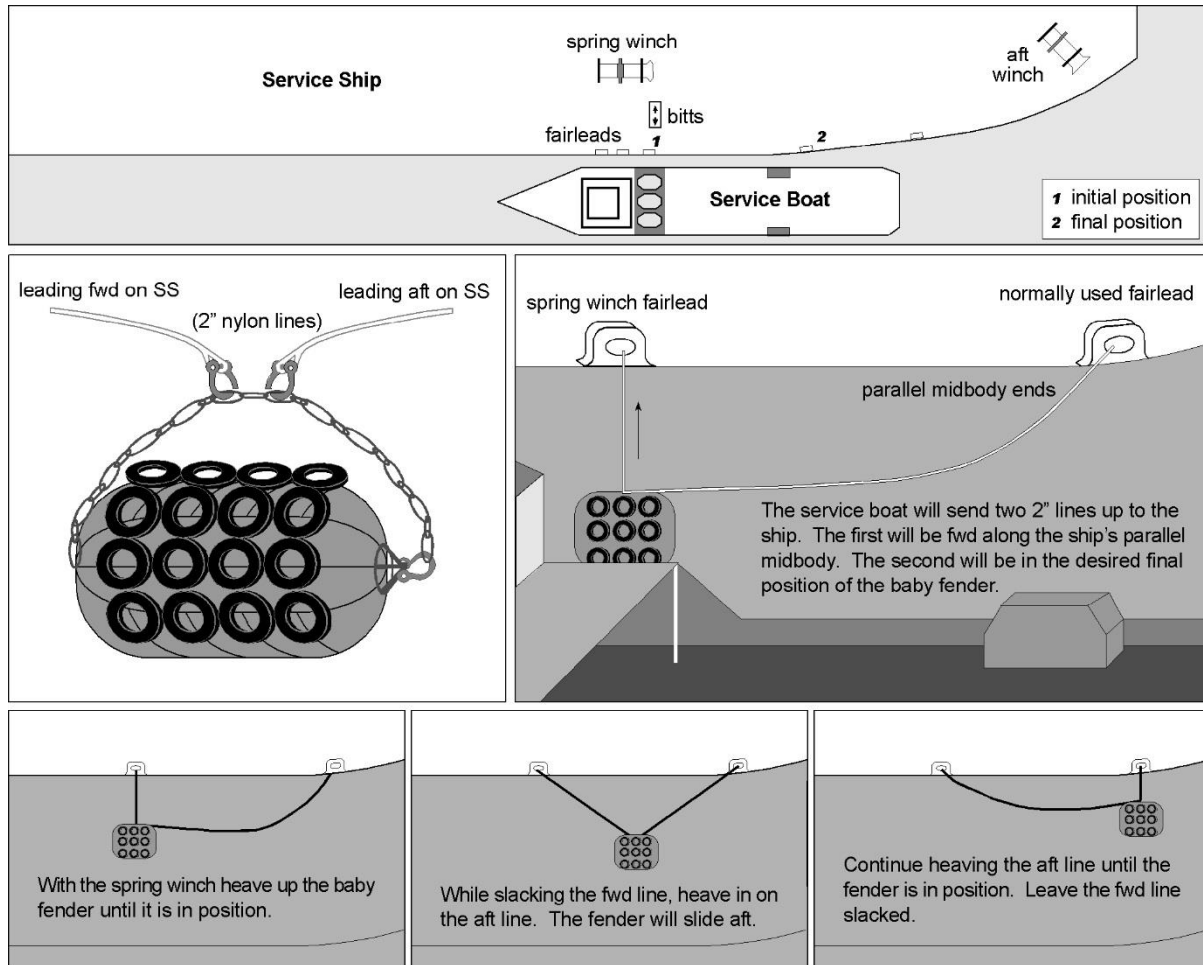
- CEASE ALL CARGO OPERATIONS AND CLOSE ALL CARGO VALVES
- CALL PORT CONTROL VHF CHANNEL 12
(TELEPHONE +46 31 731 41 15)

INJURY TO PERSON

- CALL PORT CONTROL VHF CHANNEL 12
(TELEPHONE +46 31 731 41 15)

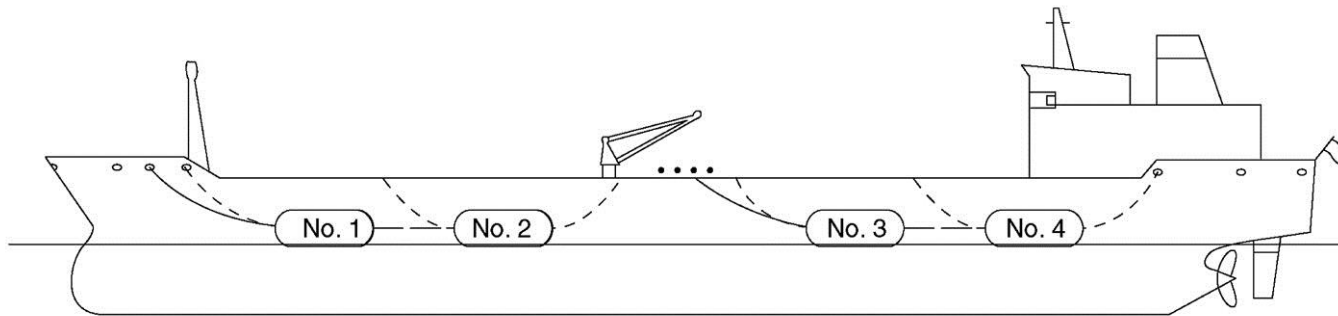
Appendix 6: Fender Moorings





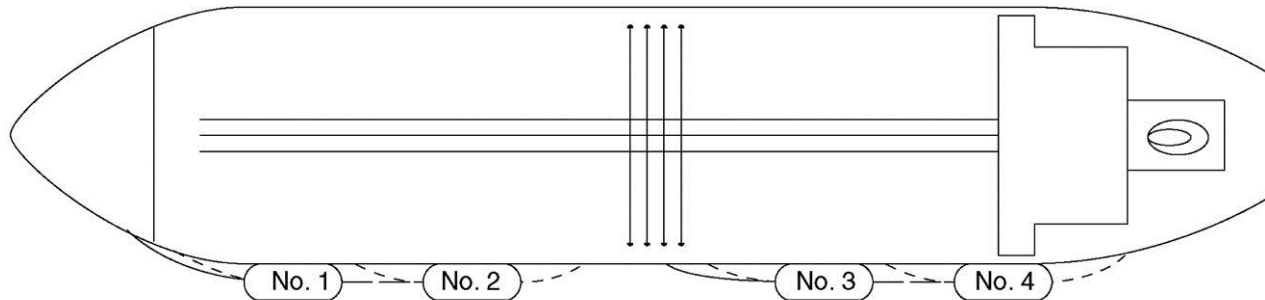
**MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS RIGGED IN PAIRS
AUGUST 2004**

drawing 1



LEGEND	
	PRIMARY (TOWING) MOORING
	SECONDARY MOORING
	CONNECTING PENNANT
	FENDER

NOTES
FOR DETAILS OF THE COMPONENTS REQUIRED, SEE THE RELATIVE MOORING ARRANGEMENT DRAWING

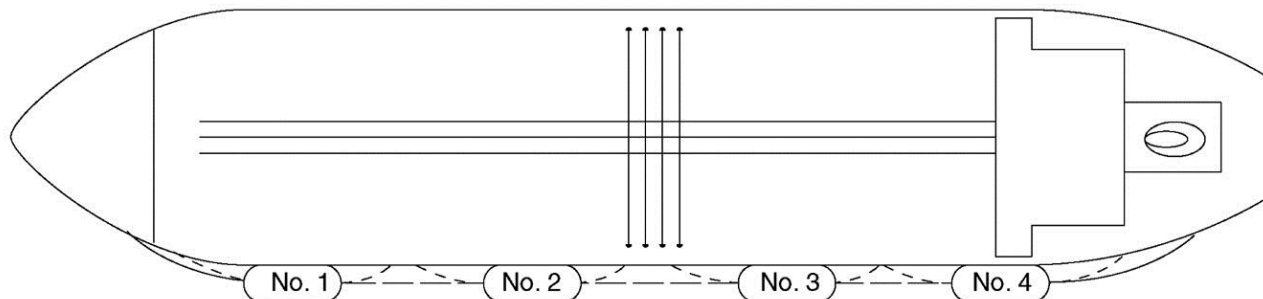
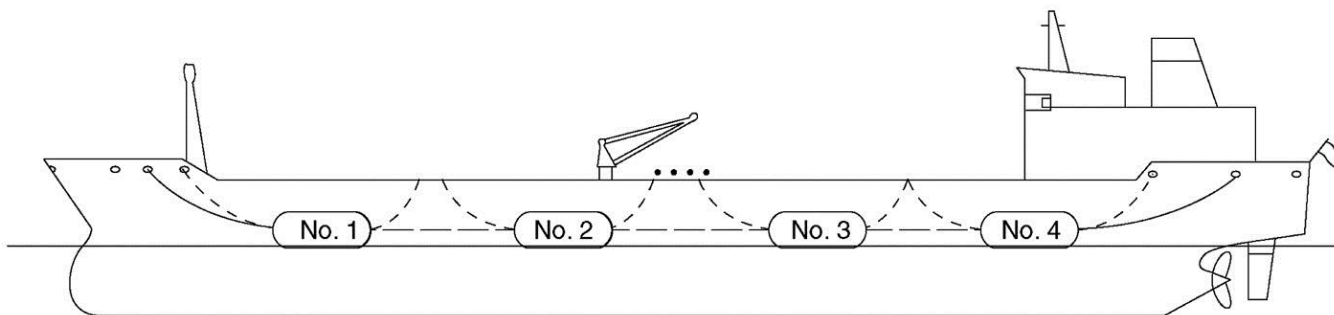


TOTAL MOORING COMPLEMENT FOR 3.3M X 6.5M FENDERS RIGGED IN PAIRS			
Total	Brief Mooring Item Description		Item
6 Pieces	60 metre Long Polypropylene Rope Secondary Mooring Rope MBL 55 T		No. 1
38 Pieces	38mm Bolt Type Anchor Shackle SWL 17 T MBL 85 T		No. 2
14 Pieces	38mm Alloy Steel Master Link SWL 18 T MBL 90 T		No. 3
2 Pieces	60 metre Long Primary Mooring Wire 28mm Dia (6 x 36) MBL 50 T		No. 4
2 Pieces	8 metre Long Nylon Rope Stretcher For Primary Mooring Wires MBL 72 T		No. 5
12 Pieces	3 metre Long Wire Fender Tails 28mm Dia (6x36) MBL 50 T		No. 6
2 Pieces	10 metre Long Polypropylene Rope Connecting Pennant MBL 55 T		No. 7
8 Pieces	38mm Double Bow Swivels SWL 20 T MBL 100 T		No. 8

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MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS RIGGED ON THE TROT
AUGUST 2004

drawing 2



LEGEND

- PRIMARY (TOWING) MOORING
- - - SECONDARY MOORING
- CONNECTING PENNANT
- FENDER

NOTES

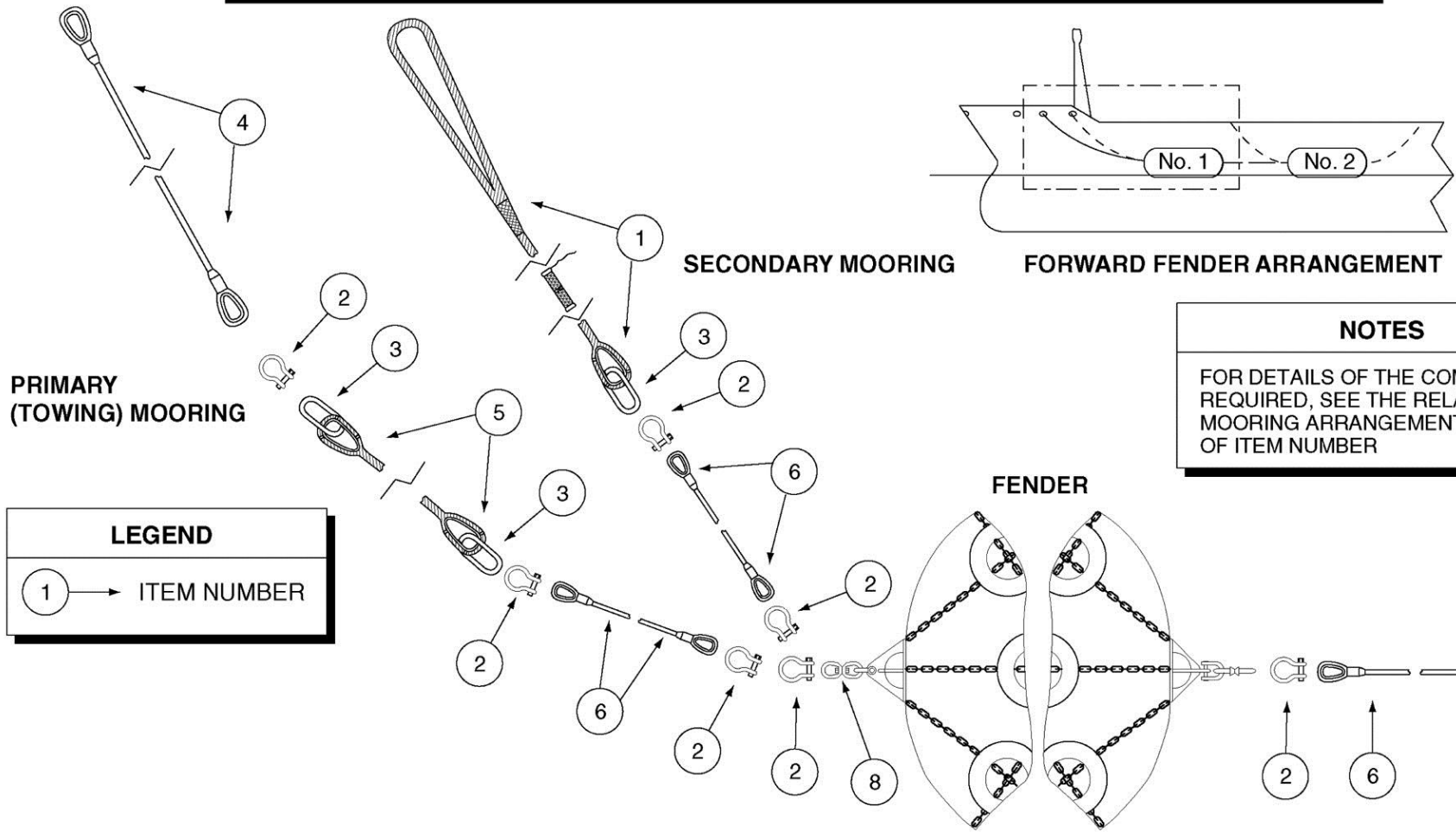
FOR DETAILS OF THE COMPONENTS REQUIRED, SEE THE RELATIVE MOORING ARRANGEMENT DRAWING

TOTAL MOORING COMPLEMENT FOR 3.3M X 6.5M FENDERS RIGGED ON THE TROT		
Total	Brief Mooring Item Description	Item
8 Pieces	60 metre Long Polypropylene Rope Secondary Mooring Rope MBL 55 T	No. 1
50 Pieces	38mm Bolt Type Anchor Shackle SWL 17 T MBL 85 T	No. 2
18 Pieces	38mm Alloy Steel Master Link SWL 18 T MBL 90 T	No. 3
2 Pieces	60 metre Long Primary Mooring Wire 28mm Dia (6 x 36) MBL 50 T	No. 4
2 Pieces	8 metre Long Nylon Rope Stretcher For Primary Mooring Wires MBL 72 T	No. 5
16 Pieces	3 metre Long Wire Fender Tails 28mm Dia (6x36) MBL 50 T	No. 6
3 Pieces	10 metre* Long Polypropylene Rope Connecting Pennant MBL 55 T	No. 7
8 Pieces	38mm Double Bow Swivels SWL 20 T MBL 100 T	No. 8

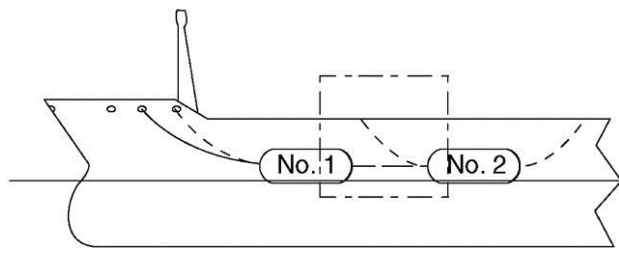
* Length should be adjusted to cover the parallel body length.

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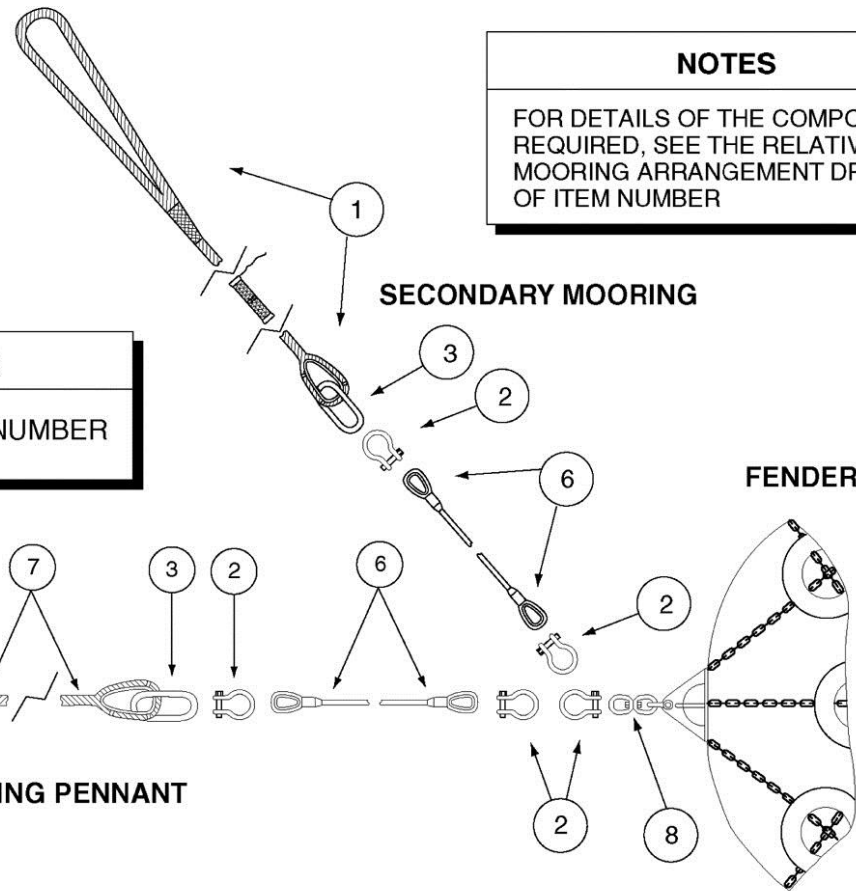
**MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS RIGGED IN PAIRS FENDER NOS 1 & 3
AUGUST 2004**



MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS RIGGED IN PAIRS FENDERS 1 & 2, AND FENDERS 3 & 4
AUGUST 2004



FORWARD FENDER ARRANGEMENT



NOTES
FOR DETAILS OF THE COMPONENTS REQUIRED, SEE THE RELATIVE MOORING ARRANGEMENT DRAWING OF ITEM NUMBER

LEGEND
1 → ITEM NUMBER

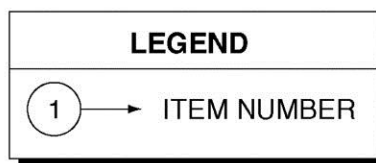
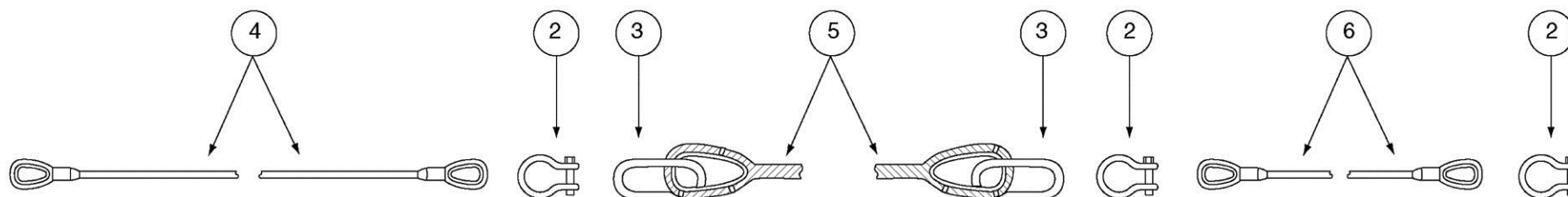
FENDER

FENDER

CONNECTING PENNANT

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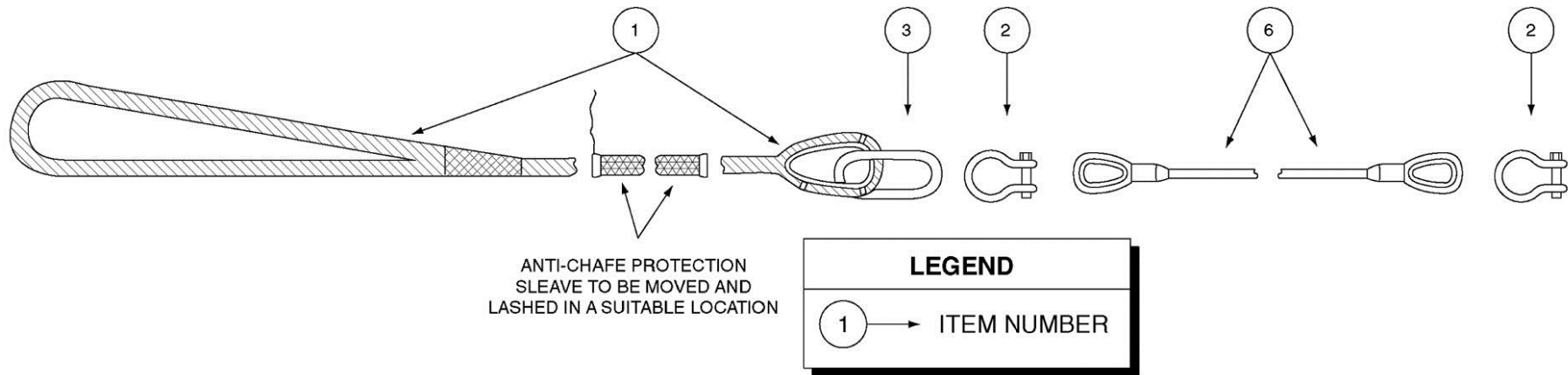
**MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS PRIMARY (TOWING) MOORING
AUGUST 2004**



PRIMARY (TOWING) MOORING ROPE ASSEMBLY FOR 3.3M X 6.5M FENDERS	
ITEM NO.	COMPONENT DESCRIPTION
Item No. 2 Joining Shackle	Joining Shackle 38mm (1½ inch) bolt type galvanised anchor shackle with bolt, nut and stainless steel split pin. SWL 17 tonnes MBL 85 tonnes. (Federal Spec RR-C-271B)
Item No. 3 Master Link	Master link 38 mm in diameter alloy steel-quenched and tempered. SWL 18 tonnes MBL 90 tonnes.
Item No. 4 Primary (Towing) Mooring	Primary (Towing) Mooring Wire 60 metres long 28mm in diameter 6 x 36 IWRC galvanised steel wire rope MBL 50 tonnes (or similar) with a hard eye by thimble and super loop at each end.
Item No. 5 Nylon Stretcher	Nylon Stretcher 8 strand nylon rope 8 metres long 64 mm in diameter MBL 72 tonnes (or similar) fitted with a galvanised towing thimble and a 38mm (1½ inch) master link MBL 90 tonnes fitted at each end.
Item No. 6 Wire Fender Tail	Wire Fender Tail 3 metres long 28 mm in diameter 6 x 36 IWRC galvanised steel wire rope MBL 50 tonnes (or similar) with a hard eye by thimble and super loop at each end.

**MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS SECONDARY MOORING
AUGUST 2004**

drawing 7



SECONDARY MOORING ROPE ASSEMBLY FOR 3.3M X 6.5M FENDERS	
ITEM NO.	COMPONENT DESCRIPTION
Item No. 1 Secondary Mooring	Secondary Mooring 60 metre long ultra violet protected chaff resistant polypropylene rope, or similar, with minimum breaking load of 55 tonnes (or similar) , a 2 metre soft PTC protected eye at one end (deck) and a thimble PTC protected eye with a 38mm SWL 18 tonnes (MBL 90 tonnes) master link at the other end. In addition to the above an anti chafe PTC / PU protected sleeve 2.5 metres long with 2 metres of 8mm log line or similar lashing at the sleeve ends to be fitted at the deck end.
Item No. 2 Joining Shackle	Joining Shackle 38mm (1½ inch) bolt type galvanised anchor shackle with bolt, nut and stainless steel split pin. SWL 17 tonnes MBL 85 tonnes. (Federal Spec RR-C-271B)
Item No. 3 Master Link	Master link 38 mm in diameter alloy steel-quenched and tempered. SWL 18 tonnes MBL 90 tonnes.
Item No. 6 Wire Fender Tail	Wire Fender Tail 3 metres long 28 mm in diameter 6 x 36 IWRC galvanised steel wire rope MBL 50 tonnes (or similar) with a hard eye by thimble and super loop at each end.

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**MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS CONNECTING PENNENT
AUGUST 2004**

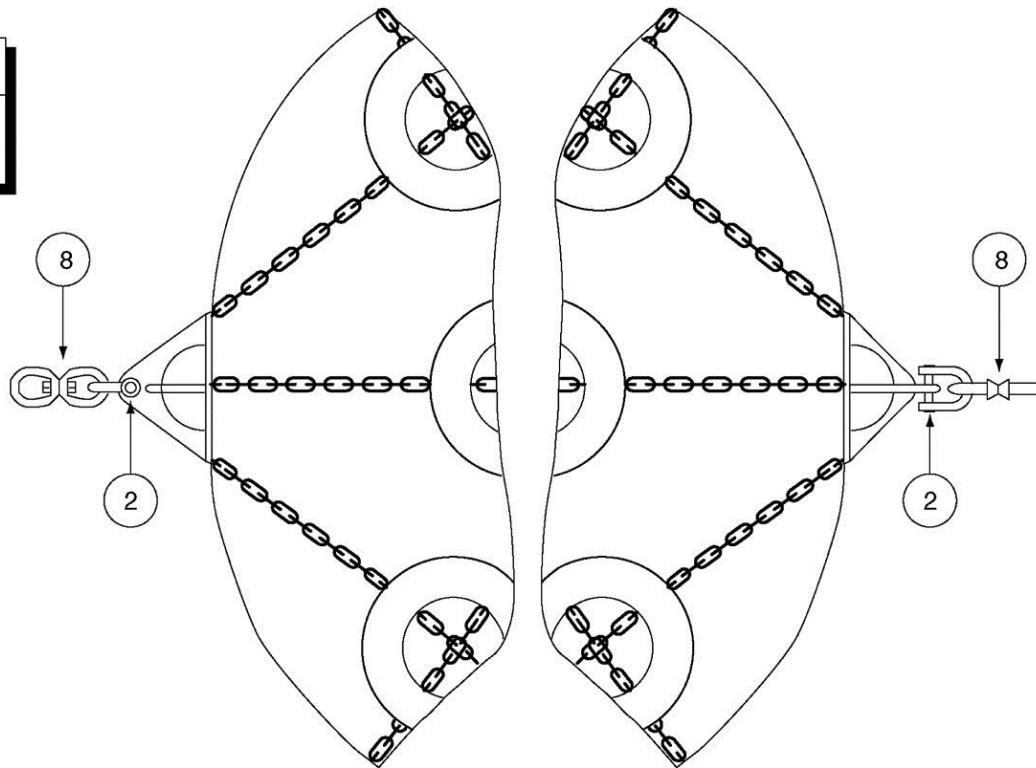
drawing 8

**MOORING ARRANGEMENT FOR 3.3M X 6.5M FENDERS
AUGUST 2004**

drawing 9

LEGEND

1 → ITEM NUMBER



FENDER ASSEMBLY FOR 3.3M X 6.5M FENDERS	
ITEM NO.	COMPONENT DESCRIPTION
Item No. 2 Joining Shackle	Joining Shackle 38mm (1½ inch) bolt type galvanised anchor shackle with bolt, nut and stainless steel split pin. SWL 17 tonnes MBL 85 tonnes.(Federal Spec RR-C-271B)
Item No. 8 Fender Swivel	Fender Double Bow Swivel 38mm (1½ inch) diameter SWL 20 tonnes and MBL 100 tonnes. Hot dipped galvanised (Federal Specification RR-C-271D)

Appendix 7: Vapour Return Checklist

Vapour Balancing Checklist

	Discharging Ship	Receiving Ship
1. Vapour hose suitable and in good condition?		
2. Main IG valve closed?		
3. Vapour recovery valves in correct position?		
4. IG plant ready for use?		
5. Vapour lines on ship drained for water?		
6. Average cargo tank oxygen level?	%	%
7. Current vapour pressure in cargo tanks?	mmWG	mmWG
8. Masthead valve. Man/auto If auto, settings?	Man / Auto mmWG	Man / Auto mmWG
9. Tank P/V valves settings?	mmWG	mmWG
10. Agreed initial cargo transfer rate?	Cbm/Hr	Cbm/hr
11. Agreed max cargo transfer rate?	Cbm/Hr	Cbm/hr
12. Vapour pressure required to maintain in tanks during transfer?	mmWG	mmWG
13. Vapour hose purged and pressure equalized between ships prior to cargo transfer?		

For Discharging Ship:	For Receiving Ship:
Date	Time
Sign	Sign
Rank	Rank